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Because of Easter vacation there will be no Bulletins April 2; next issue will be April 9

- Denmark: King-Size Dairy Farm
- Gulf of Carpentaria
- New Ideas in Aviation
- Bauxite Ships Thread Surinam Rivers
- Industry Turns to Natural Gas

FISHERMAN CHECKS HIS NET—Sea Rovers from Viking Days, Danes Catch and Export Fortunes in Fish. Girl Hosteler (above) Pauses for a Drink of Home-Grown Milk

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DANISH EMBASSY

He walked up and down the Peninsula of Jutland (Denmark's mainland) and across the four chief islands and saw for himself. And he realized that even he could never have written a tale to match what his countrymen have actually accomplished. On some of the sorriest soil in Europe, Danish farmers are prospering. Their butter covers the toast of England and, canned, is exported around the world.

The Danes learned how to make the most of their chilly climate and how to transform the sandy wastes of their nearly sea-level land into lush grazing areas and grainfields. Today they turn cattle in to graze, and harvest milk; they feed grain to chickens and harvest eggs. From the milk they churn butter and make cheese, feeding the skim to pigs. Then they butcher the hogs and produce ham and bacon.

Many a London breakfast is grown on the neat green farms of Denmark, transported there on ships of the Danish merchant fleet. In certain recent years tiny Denmark, half the size of Maine, has produced half the bacon and one fourth the butter and eggs placed in world trade.

And best of all, Hans Christian Andersen saw that the increased production had not spoiled the landscape. Scrubbed farms still nestle among blue lakes. Beyond the moorlands yellow sea beaches stretch and sailboats flash in summer sun. Denmark still is a green and gold patchwork dotted with toylike villages where cattle amble home at evening.

National Geographic References: ***Map***—Northern Europe (paper 50¢, fabric $1)

Magazine—Dec., 1955, "By Full-Rigged Ship to Denmark's Fairyland" (75¢; 55¢ when ordered by schools); Feb., 1949, "2,000 Miles Through Europe's Oldest Kingdom" (75¢)

School Bulletins—Apr. 18, 1955, "Danish Highway Dangerous When Wet" (10¢)

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DANISH EMBASSY

DANISH EMBASSY

Denmark: King-Size Dairy Farm

JONALS CO.

"Wonderful, wonderful Copenhagen, friendly old girl of a town. . . ." It is easy to imagine Hans Christian Andersen singing contentedly among the cyclists above, thinking up a new fairy tale about the modern kingdom of Denmark.

The capital of his beloved country had aged gracefully, he'd agree. But there *were* changes. Here was his Little Mermaid, all done up in bronze on a rock in the harbor (left), with children always at play near by.

Everything was more crowded, too. Denmark had more than four and a quarter million people now, nearly a fourth of them in Copenhagen. He thought about the countryside, away from the city. Was it still a storybook land of clean-swept farms where red-cheeked milkmaids drive sleek black cows down windmill-topped lanes?

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HOWELL WALKER, NATIONAL GEOGRAPHIC STAFF

STONE-AGE CITIZEN OF THE GULF COUNTRY
Wild Hunters of Groote Eylandt, off Arnhem Land, Learn to Farm on a Native Settlement at Umbakumba

reputation for brewing cyclones. Its tides fluctuate unpredictably. Plankton—tiny plant and animal life—lights its waters with phosphorescence, painting nighttime ripples with rainbow colors. Trepang, unlovely-looking sea cucumbers, abound in the gulf. Fishermen gather them to sell in the Orient as a soup-making delicacy. The gulf's sea snakes, 10 feet long, mostly poisonous, and hideously ugly, have creased, sacklike bodies of varying colors.

Gulf country aborigines have yet to feel the full impact of civilization, for this is Australia's frontier. White men have barely penetrated it. Free to live their nomadic lives, curly-haired natives wander among sun-scorched rocky uplands, back from the coast. Lean and sinewy, impervious to hardship, these hunters scour the wilderness for food, bringing down game with a dextrous flip of their woomeras, or throwing sticks, on which are seated razor-sharp spears. They can spit targets 300 feet off.

The famed boomerang, curved and sharpened wooden throwing knife which circles back to its owner if it misses, is often saved for warfare between tribes. Aborigines have strict tribal laws. Punishments for offenders are harsh and sometimes stir up a feud. Cannibalism may still occur in untouched areas.

Yet native art, folk tales, and corroborees (dances) have a primitive beauty matching that of the region itself. Storytelling pictures line caves and rock walls where aborigines once hunted. Matthew Flinders saw such drawings in 1802. They still exist today with others just like them.

As the white man pushes northward in this young, expanding nation, efforts are being made to preserve gulf country culture and help these oldest inhabitants adjust to new ways. Missionaries teach them that a little work on fertile acres may provide more food than weary days of hunting. Young "abos" learn English in mission schools, and may end up working on the vast cattle stations that spread over hundreds of square miles inland. There hardy bushmen become top-notch cowboys—except when a mysterious inner urge makes them "go walkabout" and they disappear into the wilds for weeks at a time.

National Geographic Magazine—Dec., 1949, "Exploring Stone Age Arnhem Land"; Sept., 1949, "Cruise to Stone Age Arnhem Land"; Jan., 1953, "From Spear to Hoe on Groote Eylandt" (each 75¢)

UMI

Gulf of Carpentaria

HOWELL WALKER, NATIONAL GEOGRAPHIC STAFF

Few of earth's distinct bodies of water remain as little known as the Gulf of Carpentaria, a massive dent in Australia's north coast. A few coastal traders visit it. Cautiously they nose around mud or sand shoals which may or may not be charted. Like the vessel at the right, they unload supplies for scattered missions.

North of the gulf lies Arafura Sea and beyond that the swampy shores and cloud-wrapped mountains of New Guinea. To the east, Cape York Peninsula points upward as though the Australian continent were raising an admonitory finger. Westward, wild Arnhem Land lifts its head, shaggy with tiny inlets and tropical islands, above the desolate Northern Territory.

Arnhem Land is an aboriginal reserve, barred to white men except by special permission. A joint expedition by the National Geographic Society, the Smithsonian Institution, and the Australian government probed this region of primitive natives and reported its findings in *The National Geographic Magazine* of December, 1949. Another report on a more recent expedition to this general area appears in the magazine's current issue.

White settlements are rare along the gulf coast. Most are missions, set back from the mangrove-clogged shore line. When supply vessels put in with much-needed cargoes, loads must often be transferred to lighters which skim safely over reeking mudbanks and up wide, sluggish streams to community docks. Crocodiles slither into tepid water as boats pass. There are few other signs of life along the coast—usually flat, sometimes lined with craggy cliffs.

Strangely, this inhospitable wilderness was probably the first stretch of Australian mainland that European explorers laid eyes on. In 1606, well before Pilgrims landed at Plymouth, the vessel *Duyfken* belonging to the Dutch East India Company slipped into the Gulf of Carpentaria. Other Dutch ships followed in later years. In 1802, Matthew Flinders, adventurous British navigator and explorer, surveyed much of the gulf country. His charts are still used.

Almost a third the size of the Gulf of Mexico, Carpentaria has a bad

One new-style helicopter, designed as a "test bed" for new ideas, is the Kellett KH-15 shown below. Its single rotor is powered by rockets mounted in each blade tip. The rocket engines burn hydrogen peroxide, stored in the two bulbous fuel tanks on each side of the pilot.

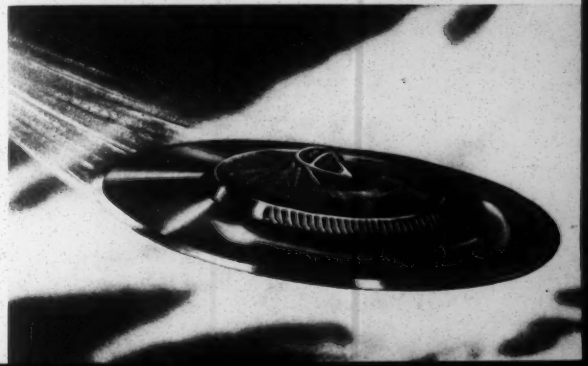
Since helicopters whirred onto the aviation scene, designers have puzzled over ways to make them fly faster without sacrificing vertical lift. One answer is the Bell XV-3 convertiplane, at the right. As the name implies, it converts in mid-flight from a helicopter to a conventional, propeller-driven craft. The rotors, mounted on wings, roll forward to act as propellers.

KELLETT AIRCRAFT CORP.

BELL AIRCRAFT CORP.

U. S. AIR FORCE, OFFICIAL

With so many new ideas in aviation, it is inevitable that a flying saucer should appear in the sky. Here it is, right, designed by the Canadian firm of Avro, Ltd. Though full details are not released (the picture is an artist's conception) this Canadian saucer also aims at combining speed with vertical take-off.



CONSOLIDATED VULTEE

New Ideas in Aviation

With a shattering blast of power, a bulky, awkward-looking aircraft rises slowly into the air—straight up. Thus the experimental Navy fighter, XFY-1 ("Pogo" to its friends), proves the feasibility of vertical take-off. Until recently, planes depended on forward speed in order to get lift. Pogo shows that lift can come from tremendous power alone.

On the ground, Pogo sits on four casters extending from its fins and the tips of its delta wings. Double propellers, thrusting from the nose, point at the sky. In the cockpit, the pilot finds himself almost lying on his back. The engine surges. Propellers claw at the air, hauling the plane off the ground. It rises, tilts forward to the horizontal, and thunders away at blistering speed. To land, it lowers itself, tail first, to the ground.

The Wright brothers would scarcely believe some of aviation's new developments. There are aircraft today that get off the ground without benefit of wings, propellers, rotors, or helium. Navy's "Flying Platform," right, uses a ducted fan. The fan's blast is directed downward, thrusting the strange craft up. Standing on his platform, the pilot simply leans in the direction he wishes to go. As the platform tilts, the thrust pushes the craft horizontally.

The Army is testing a similar one-man machine—the aerocycle. It carries a foot soldier who stands above whirling rotors and steers with handlebars.

All such aerial devices spring from the principle of the helicopter whose massive, churning blades haul men and cargoes straight up. The helicopter itself is constantly being improved, becoming simpler to operate, faster in level flight, more powerful in a climb.

U. S. NAVY, OFFICIAL

ALCOA

AFRICA TRANSPLANTED TO SURINAM—Djoeka Villagers Descend from Slaves Brought to Surinam 300 Years Ago. Their Thatched Huts Recall Ancestral Dwellings

bers. Later, free laborers were attracted from India and Java. Smaller groups of Chinese came as merchants and shopkeepers.

Most Surinamese rely largely on such crops as sugar, corn, rice, bananas, coffee, and coconuts for support. But the state's real wealth is bauxite—some of the richest deposits in the world. Proven reserves of economic worth total some 50,000,000 tons.

Other mining activities lag. But swamp forests yield such exotic hardwoods as banak and possumwood (valuable for plywood) and Surinam mahogany. Many logs go out of the interior by water. Balata, a form of rubber, drips from jungle trees.

Perhaps 86,000 of Surinam's 234,000 people live in Paramaribo, the capital, beside the broad Suriname River. Neat wooden houses and orange trees frame many streets. The "most valuable road in the world" leads to the airport 30 miles away. Built by the United States in World War II, the road has a mahogany-log base and a surface of aluminum ore.

Health standards are high. The literacy rate is about 70 percent, due primarily to compulsory education for children between seven and twelve. The urge for learning is nothing new in Surinam: the compulsory-education law took effect in 1876.

National Geographic References: ***Map***—Eastern South America (paper 50¢, fabric $1)
School Bulletins—Dec. 14, 1953, "Surinam Trade Was Gloucester's Glory" (10¢)

UMI

ALCOA

Bauxite Ships Thread Surinam Rivers

A shallow-draft steamer helped by a tug twists along the narrow Cottica River in tropical Surinam, South America's newest self-governing country. The vessel is loaded with bauxite, aluminum's basic ore. Many ships like this carry bauxite from inland mines to the not-too-distant island of Trinidad. From there, bigger vessels transport it to United States and Canadian aluminum smelters.

Few products are more modern than aluminum. Yet the primitive scene below is viewed from the deck of an air-conditioned ore carrier in Surinam starting the miracle metal on its first leg toward creation.

However, many-sided Surinam is far from adequately represented by this one photograph. Wedged between British and French Guiana, it includes citizens of Dutch, Hindustani, Creole, Chinese, South American Indian, Javanese, and African descent. Once an English colony, and later Dutch, Surinam has enjoyed internal self-government for some five years, a fact recently recognized by the United Nations. The Netherlands retains control of defense and foreign affairs.

England traded the hot, moist, remote country to the Netherlands for Nieuw Amsterdam (New York) in the 1667 Treaty of Breda. Early Dutch colonists established plantations along the coast, but soon realized that only men bred to the tropics could labor in the humid climate. Finding natives unsuited to plantation work, they imported Africans in large num-

NATIONAL GEOGRAPHIC PHOTOGRAPHER ROBERT F. SISSON

NERVE CENTER OF PIPELINE SYSTEM
Dispatchers Move a Peg on the Map and Reserves of Gas Fill Mealtime Demands

conform to hills and valleys, to carry gas into the existing network.

Once the line is buried, the job has just begun. Compressor pumps keep the gas moving steadily, filling demands that fluctuate with time of day and weather conditions. A cold spell means an increased drain on the system for gas furnaces. Rain causes gas-driven irrigation pumps to take a rest. On week ends, gas-run factories close down. At meal times thousands of gas stoves are turned on. To help keep the flow constant, spare gas is stored underground in old, exhausted gas wells to be tapped when needed.

Steel pipe can break or develop leaks when expansion and contrac-

tion twists it or scrapes its surface against rock. Maintenance men check the network for seepage, watching pressure gauges, sometimes spotting, from their patrol jeeps, clouds of dust and stones hurled into the air by high-pressure gas rushing from an underground break. Flies are attracted by gas although it kills them. When trouble shooters see a swarm of flies near a pipe line, they look for a leak.

Once a crack has been uncovered, welders move in to close it. Often they ignite escaping gas to keep it from accumulating and possibly exploding. Then, working right through the flame, they weld the flaw.

Only one object aside from gas

TEXAS EASTERN

FINAL CHECK ON QUALITY OF GAS
Engineers Spot Moisture and Other Impurities to Be Removed Before Delivery

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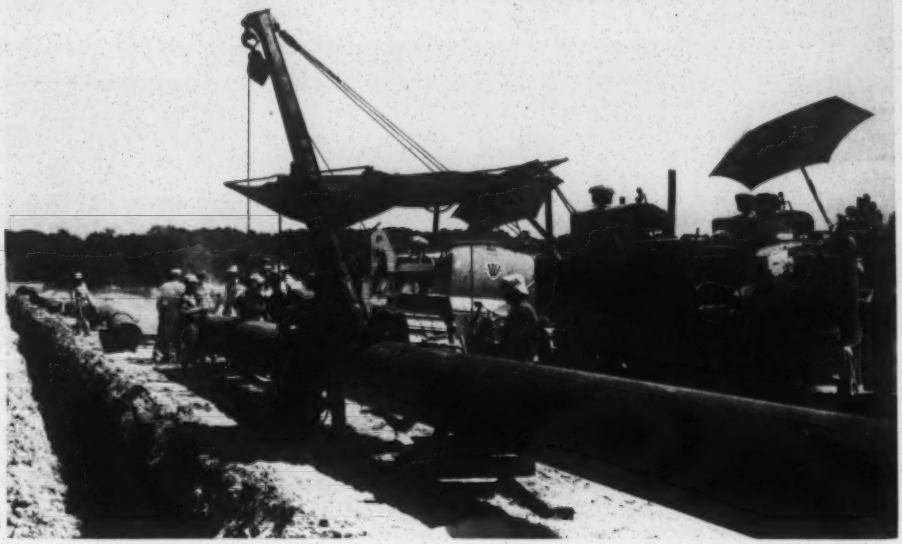


TEXAS EASTERN

Industry Turns to Natural Gas

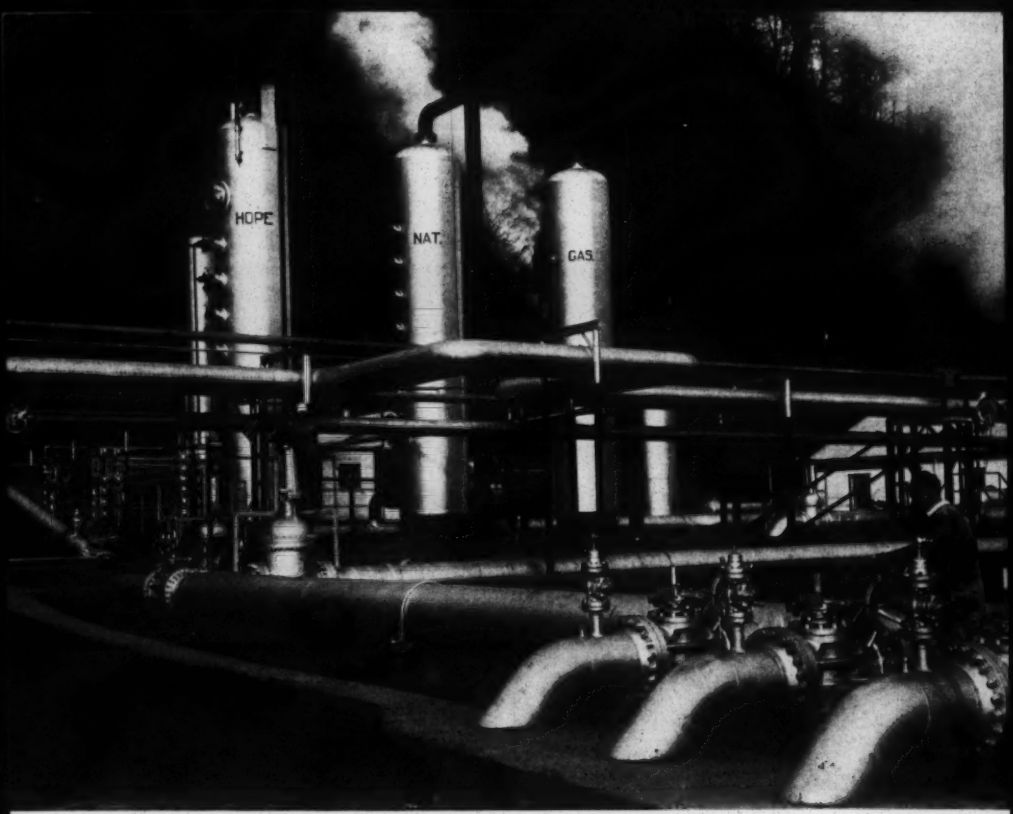
It is soundless, invisible, and shapeless. It moves through a vast transportation system that is rarely noticeable. Almost half of all American homes use it, along with some 2,000,000 industrial plants. It is natural gas.

Twenty-two states produce it, Texas alone supplying half the total. Pumps send it through a network of underground pipes (above) that nearly covers the United States. Stretched out, these steel tubes would circle earth 17 times—a far longer mileage than all main-line American railroads combined. Yet except for pumping stations and occasional overhead ducts, crossing streams and gullies, this arterial system of the nation's sixth-largest industry remains out of sight.

Until the end of World War II, natural gas was a relatively minor source of energy though people had known of it since days of antiquity. The Chinese used it 3,000 years ago. Its fumes, seeping from a gas field, hung about the ancient Greek oracle at Delphi and caused seekers of advice to grow mysteriously light-headed from "the breath of Apollo." In 1821 natural gas was first produced commercially at Fredonia, New York, lighting its streets and cooking a meal for General Lafayette when he visited the city four years later.

But only after oil began to gush from drillings did natural gas hiss from the earth in quantity. With no effective way to deliver it, oilmen simply burned it off as a bothersome by-product. Pipes were needed to harness and guide this fuel. At the end of World War II, when steel became available, pipes filled the demand.

When a new gas field is opened, engineers lay seamless steel pipe, probably two feet or more in diameter, its sections welded and bent to

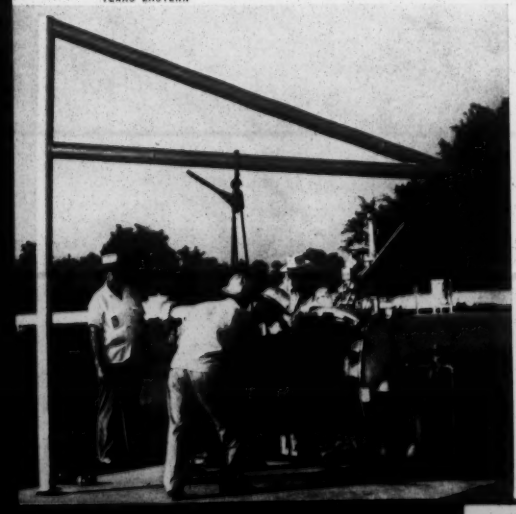


NATIONAL GEOGRAPHIC PHOTOGRAPHER ROBERT F. SISSON

GAS AND GASOLINE CHANGE ROLES—Once an Unwanted By-Product of Petroleum, Natural Gas Now Supplies Butane, Propane, and "Natural Gasoline" as Valuable By-Products. Extraction Plants Like This One in Virginia Remove These Liquids

travels through the pipe. This is the so-called "pig," a brush-covered cylinder used to clean the inside of a pipeline. Loaded into a stretch of pipe like an artillery shell (below), the pig is shoved along by pressure at some 80 miles an hour, scouring the tube as it goes. Reaching a temporarily opened end, it shoots out like a massive projectile for perhaps a hundred yards. Behind it is a spotless pipe, ready to carry clean fuel to fill about 25 percent of the nation's total energy requirements.

TEXAS EASTERN



Though Italy and Pakistan are rising as natural-gas producers overseas, the United States still produces some 80 percent of the world's supply. No shortage of natural gas threatens. Known reserves in the United States total well over 1,200 cubic miles. Collected in one underground deposit, this untapped resource would fill a cavern 10 miles long, 10 miles wide, 12 miles high.